- Remote Control (except for Communications Box)

General Topic	Problem	Section
Controller Pivot	Controller Pivot is too tight or loose.	Section 5.2.1
Injector Head Pivot	Injector Head Pivot is too tight or loose.	Section 5.2.2
Injector Cables	Damaged Injector Cable, EDA Cable	Section 5.3
Injector Controller	Replacing Injector Controller Cable Cover	Section 5.4.1
	Replacing Injector Controller Front Enclosure	Section 5.4.2
	Replacing Injector Controller Front Enclosure	Section 5.4.2
	Replacing Single Board Computer	Section 5.4.3
	Replacing Controller PCB	Section 5.4.4
	Replacing EL Display	Section 5.4.5
	Replacing Display to Controller PCB Ribbon Cable	Section 5.4.6
	Replacing Membrane Panel	Section 5.4.7
	Replacing Beacon PCB	Section 5.4.8
	Replacing Power Switch	Section 5.4.9
	Replacing Pendant Port Cable Assembly	Section 5.4.10
	Replacing Injector Head Rear Enclosure	Section 5.5.1
	Replacing Syringe Heater	Section 5.5.2
	Replacing Heater Harness	Section 5.5.3
	Replacing Injector Mechanism	Section 5.5.4
	Replacing Door Sensor	Section 5.5.5
	Replacing Motor	Section 5.5.6

General Topic	Problem	Section
Injector Head	Replacing Linear Potentiometer	Section 5.5.7
	Replacing Locking Detent Rod Assembly	Section 5.5.8
	Replacing Interconnect PCB Assembly	Section 5.5.9
Power Supply	Replacing Fuses	Section 5.6.1
Remote Control	Replacing Remote Interface Cover	Section 5.7.1
	Replacing Remote Communications Box Assembly	Section 5.7.2
	Replacing Remote Power Cable Assembly	Section 5.7.3
	Replacing Remote Communications Cable Assembly	Section 5.7.4
	Replacing Remote PCB Assembly	Section 5.7.5
EDA	Replacing EDA PCB	Section 5.8.1
	Replacing EDA PCB to Power/Communications Connector Harness	Section 5.8.2
	Replacing EDA Receptacle Assembly	Section 5.8.3
System Components	Replacing Power/Communications Cable	Section 5.9.1
	Replacing Communications Cable	Section 5.9.2
	Replacing Injector on a Floor Stand	Section 5.9.3
	Replacing Injector on a Overhead Mount	Section 5.9.4
	Replacing EDA Module	Section 5.9.5
	Replacing Power Supply Assembly	Section 5.9.6
	Replacing Remote Control	Section 5.9.7

5.2 INJECTOR PIVOT JUNCTIONS

The Injector Controller and Injector Head positions can be manually adjusted by rotating them on their vertical axis and horizontal axis, respectively. If the Injector Controller rotates too loosely or offers too much resistance, the Controller Pivot Assembly can be repaired or replaced. If the Injector Head rotates too loosely or offers too much resistance, the Injector Pivot lock nut must be adjusted.

The Injector Controller Pivot can have two design configurations. The first configuration is a fixed assembly which can not be adjusted. The second configuration is an adjustable design

5.2.1 Controller Pivot Assembly (Fixed design)

The Injector Controller Pivot is not adjustable. A friction pad is used to create the correct amount of drag when the Controller Assembly is rotated. If the Pivot is damaged, the Injector should be returned for service.

5.2.2 Controller Pivot Assembly (Adjustable design)

The Controller Pivot Assembly must be replaced when the Injector Controller rotates too loosely or offers too much resistance. The first step is to attempt to repair the swivel mechanism for the Controller Pivot Assembly.

Required Tools: *Phillips screwdriver*
5/32" Allen wrench
5/64" Allen wrench

5.2.2.1 Repairing the Controller Pivot Assembly

1. Power down the system and disconnect the Power Supply's AC line cord from the wall outlet.
2. Disconnect and remove the Pendant Switch and EDA Clip (if applicable) from the Injector Controller.
3. Remove the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).
4. Remove Set Screws #8-32 x 1/4", Socket, Full Dog Point, nylon patch from screw holes in counter-bored holes in Pivot Junction. Replace the two set screws and reseat into counter-bored holes in Pivot Junction until fully bottomed.
5. Recheck Injector Controller and verify if it rotates too loosely or offers too much resistance.

6. Proceed to section 5.2.2.2 if the Injector Controller is still too loose or too tight when rotating.

7. Otherwise, Install the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

8. Install the Pendant Switch and EDA Clip assembly (if applicable).

9. No testing required after repair.

5.2.2.2 Removing the Controller Pivot Assembly

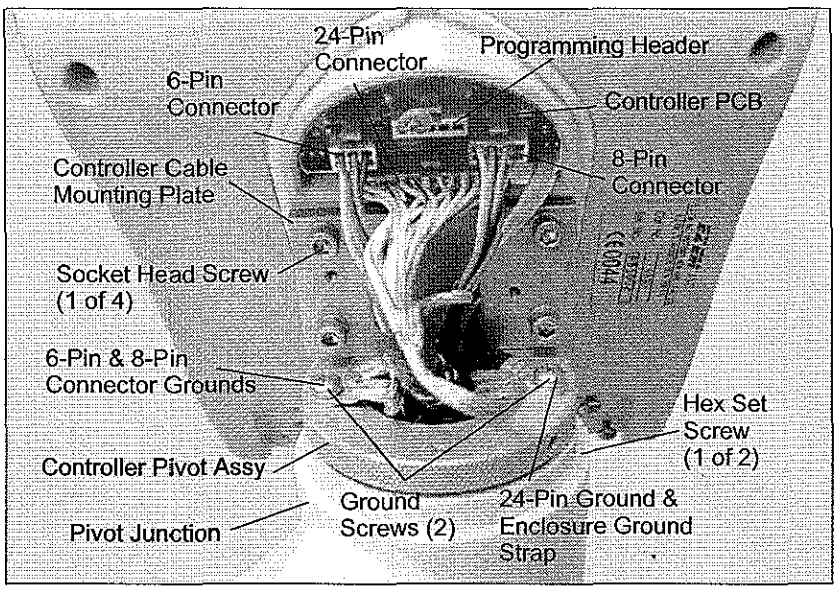


Figure 5-1a: Controller Pivot Assembly

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. Disconnect and remove the Pendant Switch and EDA Clip (if applicable) from the Injector Controller.

3. Remove the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

4. Disconnect the 6-pin, 8-pin, and 24-pin connectors from the back of the Controller PCB. Do not disconnect the Programming Header (see Figure 5-1a).

5. Remove the two Phillips ground screws and remove the four ground wires. Each screw has a lock washer and flat washer (see Figure 5-1a).

6. Use the 5/32" Allen wrench to remove the four socket head cap screws that secure the Injector Controller to the Controller Cable Mounting Plate (see Figure 5-1b). **Hold onto the Injector Controller. Do not allow it to fall.** Each screw has a lock washer. Place the Injector Controller on a clean surface in a safe area.

7. Use the 5/64" Allen wrench to remove two hex set screws on opposite sides of the Pivot Junction (see Figure 5-1c). Lift and remove the Controller Pivot Assembly while pushing the cables and ground wires through the opening. **Secure the cables. Do not allow them to fall into the pole (floor stand mount) or the Injector Mounting Arm (wall or ceiling mount).**

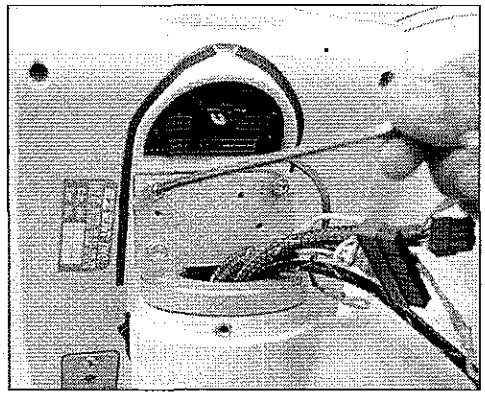


Figure 5-1b: Removing Socket Head Screws

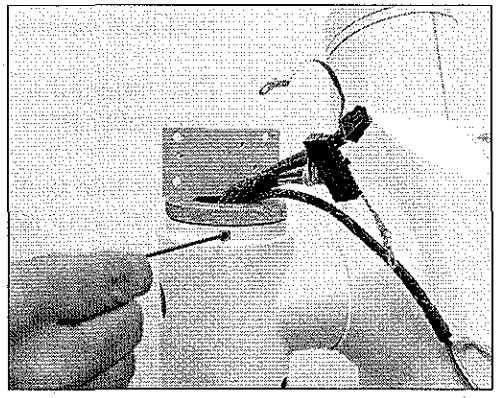


Figure 5-1c: Removing Hex Set Screws

5.2.1.3 Installing the Controller Pivot Assembly

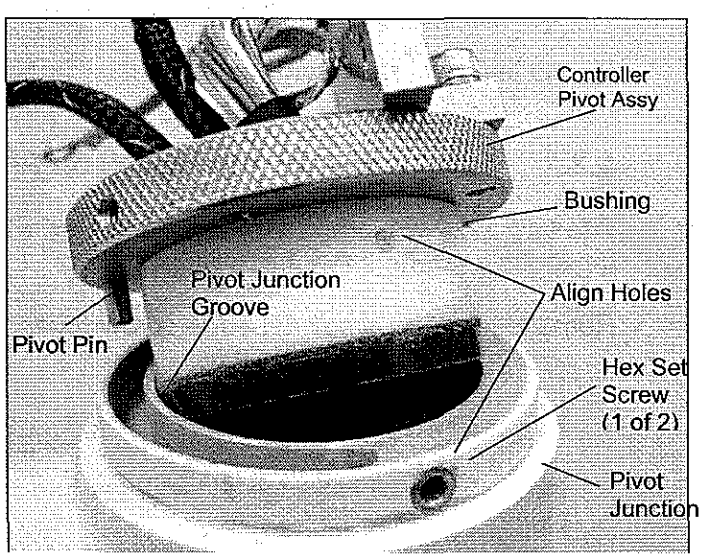


Figure 5-1d: Controller Pivot Assembly

1. Install the new Controller Pivot Assembly into the Pivot Junction while pulling the cables and ground wires through the opening. Make the following alignments while installing (see Figure 5-1d):

   a. Align the pivot pin in the Pivot Junction groove.

   b. Align the counter-bored holes in the Pivot Bushing (white nylon) with the set screw holes.

2. Use the 5/64" Allen wrench to secure the two hex set screws on opposite sides of the Pivot Junction until they are fully bottomed (see Figure 5-1c). **Do not over-tighten.**

   Note: The screws go in easily. Stop when resistance is encountered.

3. Use the 5/32" Allen wrench to secure the Injector Controller to the Controller Cable Mounting Plate with the four socket head cap screws and lock washers (see Figure 5-1b).

4. Reconnect the 6-pin, 8-pin, and 24-pin connectors to the back of the Controller PCB.

5. Check that operation of Controller Pivot does not offer too much resistance or is too loose.

6. Secure the four ground straps to the Controller Pivot Assembly using the two Phillips ground screws with flat washers and lock washers (install flat washer before lock washer). Place the ground wires from the 6-pin and 8-pin connectors on the left screw, and place the ground wire from the 24-pin connector and the ground strap from the enclosure on the right screw.

7. Install the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

8. Install the Pendant Switch and EDA Clip assembly (if applicable).

9. No test required after repair.

5.2.2 Adjusting the Injector Head Pivot

The Injector Pivot lock nut must be adjusted when the Injector Head rotates too loosely or offers too much resistance.

Required Tools: *small flat-edge screwdriver*
7/16" nut driver

1. Power down the system.

2. Insert the small flat-edge screwdriver into the plug recess and remove plug (see Figure 5-2a).

3. Use the 7/16" nut driver to turn the lock nut (see Figure 5-2b). Turn clockwise to tighten or counter-clockwise to loosen. No testing required after tightening.

   Note: Do not over-tighten. There should be sufficient resistance so that the Injector Head stays in place when released.

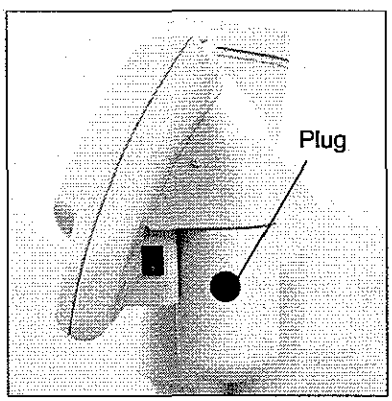


Figure 5-2a: Plug

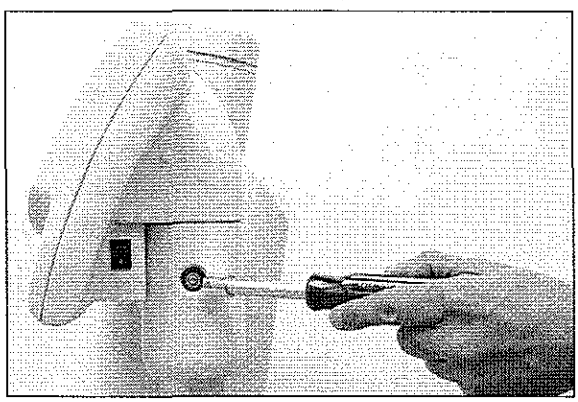


Figure 5-2b: Adjusting Injector Head Pivot

5.3 INJECTOR CABLES

This section provides procedures pertaining to the removal and replacement of the Injector pigtail cable, EDA pigtail cable, and 24-pin cable (also referred to as the Injector to Display Interconnect Harness).

5.3.1 Replacing the Injector Pigtail Cable

The Injector pigtail is connected on one end as a 6-pin connector to the back of the Injector Controller (see Figure 5-1a). The other end of the cable is routed to the bottom of the pole (floor mounting) or up through the Injector Mounting Arm (overhead mounting) where it is connected to the power/communications cable that connects to the Power Supply (see Section 5.9.1 – Replacing the power/communications Cable).

The following provides procedures for removing and installing the Injector pigtail cable.

Required Tools: Phillips screwdriver

5.3.1.1 Removing the Injector Pigtail Cable

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. If the system has an EDA module installed, do the following; otherwise proceed to Step 3:
   a. Uninstall the EDA module (see Section 5.9.5 – Replacing the EDA Module).
   b. Remove the EDA pigtail connector and ground lug from the back of the EDA module and push them into the pole (floor mounting) or Injector Mounting Arm (overhead mounting).
3. Disconnect the Injector pigtail cable from the power/communications cable, and push it into the pole (floor mounting) or Injector Mounting Arm (overhead mounting).
4. Remove the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).
5. Remove the Injector pigtail's ground strap from the Controller Pivot Assembly (see Figure 5-1a). You must first remove the Phillips screw with its lock washer and flat washer.
6. Uninstall the Injector from its mounting (see Section 5.9.3 – Replacing the Injector), and place it on a clean work surface.

7. Disconnect the 6-pin connector from the back of the Controller PCB and carefully remove the Injector pigtail cable.

5.3.1.2 Installing the Injector Pigtail Cable

Note: The Injector is currently uninstalled.

1. Install the Injector pigtail cable through the Injector pivot and connect the 6-pin connector to the back of the Controller PCB (see Figure 5-1a).
2. Install the Injector on its mounting (see Section 5.9.3 – Replacing the Injector).
3. Replace the Injector pigtail's ground strap on the Controller's Pivot Assembly (see Figure 5-1a). Secure with flat washer, lock washer, and Phillips screw.
4. Install the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).
5. Connect the Injector pigtail cable to the power/communications cable (see Section 5.9.1 – Replacing the power/communications Cable).
6. If the system includes the optional EDA, install the EDA module (see Section 5.9.5 – Replacing the EDA Module).
7. After installation of Injector Pigtail Cable, perform Field Test Form (see section 7.1 – Field Test Form).

5.3.2 Replacing the EDA Pigtail Cable

This section applies only to systems that have the optional EDA module installed.

The EDA pigtail is a 6-wire cable with an 8-pin connector that is connected to the back of the Injector Controller (see Figure 5-1a). The other end of the cable is routed downward in the pole (floor mounting) or upward through the Injector Mounting Arm (overhead mounting) where it is connected to the EDA module (see Section 5.9.5 – Replacing the EDA Module).

The following provides procedures for removing and installing the EDA pigtail cable.

Required Tools: Phillips screwdriver

5.3.2.1 Removing the EDA Pigtail Cable

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. Do the following:

   a. Uninstall the EDA module (see Section 5.9.5 – Replacing the EDA Module).

   b. Remove the EDA pigtail connector and ground lug from the back of the EDA module and push them into the pole (floor mounting) or Injector Mounting Arm.

3. Disconnect the Injector pigtail cable from the power/communications cable, and push it into the pole (floor mounting) or Injector Mounting Arm (overhead mounting).

4. Remove the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

5. Remove the EDA pigtail's ground strap from the Controller Pivot Assembly (see Figure 5-1a). You must first remove the Phillips screw with its lock washer and flat washer.

6. Uninstall the Injector from its mounting (see Section 5.9.3 – Replacing the Injector), and place it on a clean work area.

7. Disconnect the 8-pin connector from the back of the Controller PCB and carefully remove the EDA pigtail cable.

5.3.2.2 Installing the EDA Pigtail Cable

Note: The Injector is currently uninstalled.

1. Install the EDA pigtail cable through the Injector pivot and connect the 8-pin connector to the back of the Injector Controller (see Figure 5-1a).

2. Install the Injector on its mounting (see Section 5.9.3 – Replacing the Injector).

3. Replace the EDA pigtail's ground strap on the Controller's Pivot Assembly (see Figure 5-1a). Secure with flat washer, lock washer, and Phillips screw.

4. Install the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

5. Connect the Injector pigtail cable to the power/communications cable (see Section 5.9.1 – Replacing the power/communications Cable).

6. Install the EDA module (see Section 5.9.5 – Replacing the EDA Module).

7. After installation of EDA Pigtail Cable, perform Field Test Form (see section 7.1 – Field Test Form).

5.3.3 Replacing the 24-Pin Cable

The 24-pin cable (Injector to Display Interconnect Harness) connects the Interconnect PCB inside the Injector Head to the back of the Injector Controller PCB. **It is not field-repairable**. The Injector must be uninstalled from its mounting and returned to the factory.

For factor repair, refer to Empower CT Injector A.I. #018-4004, Injector Final Assembly Instructions.

5.4 INJECTOR CONTROLLER

This section provides procedures pertaining to the Injector Controller.

5.4.1 Replacing the Injector Controller Cable Cover

The following provides procedures for removing and installing the Injector Controller Cable Cover.

Required Tools: flat-edge screwdriver

5.4.1.1 Removing the Injector Controller Cable Cover

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Use the flat-edge screwdriver to remove two nylon screws on opposite sides of the Injector Controller Cable Cover (see Figure 5-3).
3. Lift and remove the cover.

5.4.1.2 Installing the Injector Controller Cable Cover

1. Place the Injector Controller Cable Cover into position.
2. Use a flat-edge screwdriver to secure the cover with two nylon screws (see Figure 5-3). Screws are placed on opposite sides of the cover.
3. No testing required after installation.

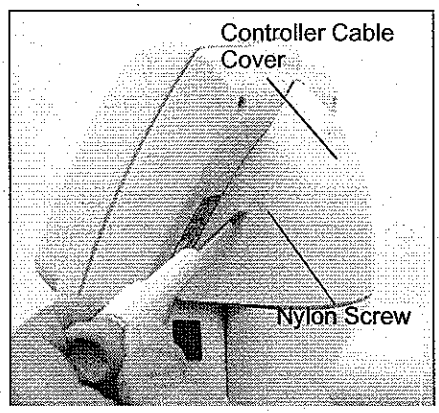


Figure 5-3: Cable Cover

5.4.2 Replacing the Injector Controller's Front Enclosure

The following provides procedures for removing and installing the Injector Controller's Front Enclosure.

Required Tools: Phillips screwdriver

5.4.2.1 Removing the Injector Controller's Front Enclosure

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Remove the four corner Phillips screws from the Injector Controller's Rear Enclosure (see Figure 5-4a).
3. Gently lift the Front Enclosure just a few inches and disconnect the two cables (Membrane Panel Cable and Display to Controller PCB Ribbon Cable) from the Controller PCB (see Figure 5-4b).

5.4.2.2 Installing the Injector Controller's Front Enclosure

1. Connect the two cables from the Front Enclosure (Membrane Panel Cable and Display to Controller PCB Ribbon Cable) to the Controller PCB (see Figure 5-4b).

2. Secure the Front Enclosure to the Rear Enclosure with four corner Phillips screws (see Figure 5-4a).

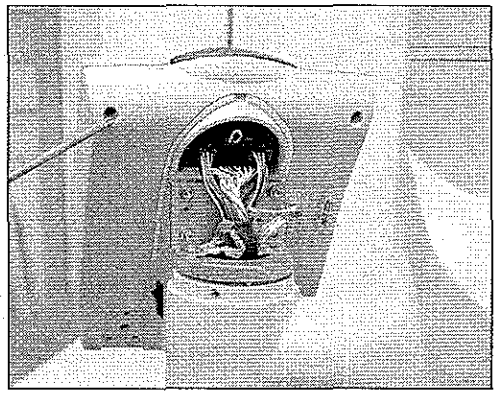


Figure 5-4a: Injector Controller

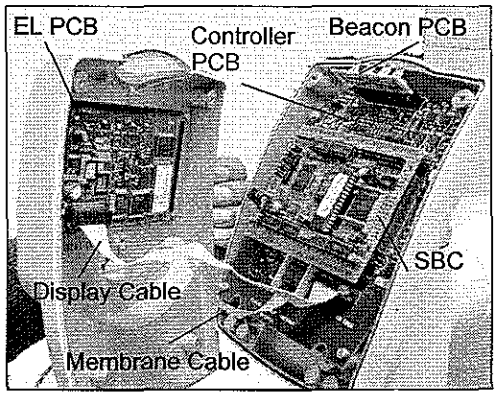


Figure 5-4b: Injector Controller

3. After installation of Injector Controller Cover, perform Field Test Form (see section 7.1 – Field Test Form).

5.4.3 Replacing the Single Board Computer

The Single Board Computer is mounted on the Controller PCB and may be removed from the Controller PCB when performing factory repairs only. When **field servicing**, replace both boards by removing the Controller PCB. **Do not attempt to separate them.**

WARNING

Attempting to separate the Single Board Computer and Controller PCB may result in damage to both boards.

The Single Board Computer is programmed with the pressure profile data (m and b constants) that are unique to each system. Before removing the Single Board Computer, retrieve the pressure profile from the current Single Board Computer using the procedure in Section 7.3.1 – Retrieving Pressure Profile Data. These values will be later programmed into the new Single Board Computer using the procedure in Section 7.3.2 – Programming Pressure Profile Data.

Note: There is no need to retrieve and reprogram the pressure profile if the Controller and Single Board Computers are being removed temporarily for troubleshooting purposes.

Required Tools: *Phillips screwdriver*
flat-edge screwdriver

5.4.3.1 Removing the Single Board Computer

1. Power up the system and retrieve and record the pressure profile data (m and b constants) from the current Single Board Computer (see Section 7.3.1 – Retrieving Pressure Profile Data).

   Note: If these constants cannot be retrieved, contact E-Z-EM Service Department and provide the system's serial number located on the back of the Injector Controller. Service Department will provide the required m and b constants.

2. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

3. Remove the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

4. Disconnect the 6-pin, 8-pin, and 24-pin connectors from the back of the Controller PCB. Do not disconnect the Programming Header (see Figure 5-1a).

5. Remove the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).

6. Remove the Single Board Computer as follows:

   > **For factory testing**, remove the Single Board Computer from the Controller PCB by gently prying it loose. It is mounted on connectors on all four sides (see Figure 5-6a). Use extreme care not to break the PCB.

   > **For field testing**, leave the Single Board Computer on the Controller PCB and remove the Controller PCB (see Section 5.4.4 – Replacing the Controller PCB). **Do not attempt to remove the Single Board Computer**.

5.4.3.2 Installing the Single Board Computer

1. Install the Single Board Computer as follows:

   > **For factory testing**, carefully install a new Single Board Computer on the Controller PCB. It is mounted on connectors on all four sides (see Figure 5-6a). Use extreme care not to break the PCB.

   > **For field testing**, Install a new Controller PCB with a factory-installed Single Board Computer (see Section 5.4.4 – Replacing the Controller PCB).

2. Connect the 6-pin, 8-pin, and 24-pin connectors to the back of the Controller PCB (see Figure 5-1a).

3. Install the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

4. Install the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).

5. Plug the Power Supply's AC/Mains power cord into the wall outlet and power up the system. Program the pressure profile into the new Single Board Computer (see Section 7.3.2 – Programming Pressure Profile Data).

6. After installation of Single Board Computer, perform the Linear Potentiometer adjustment (see Section 7.2 – Adjusting the Linear Potentiometer) then Field Test Form (see Section 7.1 – Field Test Form).

5.4.4 Replacing the Controller PCB

The Single Board Computer is mounted on the Controller PCB and may be removed from the Controller PCB when performing **factory repairs only**. When **field-servicing**, replace both boards by removing the Controller PCB. **Do not attempt to separate them**.

Attempting to separate the Single Board Computer and Controller PCBs may result in damage to both boards.

The Single Board Computer is programmed with the pressure profile data (m and b constants) that are unique to each system. If it is being replaced along with the Controller PCB, retrieve the pressure profile from the current Single Board Computer using the procedure in Section 7.3.1 – Retrieving Pressure Profile Data. These values will be later programmed into the new Single Board Computer using the procedure in Section 7.3.2 – Programming Pressure Profile Data.

Note: There is no need to retrieve and reprogram the pressure profile if the Controller and Single Board Computers are being removed temporarily for troubleshooting purposes.

Required Tools: Phillips screwdriver
flat-edge screwdriver

5.4.4.1 Removing the Controller PCB

1. Begin the removal procedure as follows:

   > **For field service**, power up the system and retrieve and record the pressure profile data (m and b constants) from the current Single Board Computer (see Section 7.3.1 – Retrieving Pressure Profile Data). After retrieving the pressure profile data, proceed to Step 2.

   Note: If these constants cannot be retrieved, contact E-Z-EM Service Department and provide the system's serial number located on the back of the Injector Controller. Service Department will provide the required m and b constants.

> **For factory service**, and the current Single Board Computer will be reinstalled, proceed to Step 2.

2. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

3. Remove the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

4. Disconnect the 6-pin, 8-pin, and 24-pin connectors from the back of the Controller PCB. Do not disconnect the Programming Header (see Figure 5-1a).

5. Remove the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).

6. Remove the Beacon PCB Assembly (see Figure 5-6a) and put it in a safe place.

7. Do the following:

   > **For factory service**, remove the Single Board Computer from the Controller PCB by gently prying it loose and put it in a safe place on an ESD pad. It is mounted on connectors on all four sides (see Figure 5-6a). Use extreme care not to break the PCB. After removing the Single Board Computer, proceed to Step 9.

   > **For field service**, leave the Single Board Computer and proceed to Step 9. **Do not attempt to remove the Single Board Computer.**

8. Use the Phillips screwdriver to remove four corner screws from Controller PCB (see Figure 5-6a).

9. Carefully lift the Controller PCB a few inches and disconnect the 2-pin connector (Pendant Port Cable Assembly) and the 4-pin connector (Power Switch Assembly) from the back of the PCB (see Figure 5-6b).

10. Remove the Controller PCB.

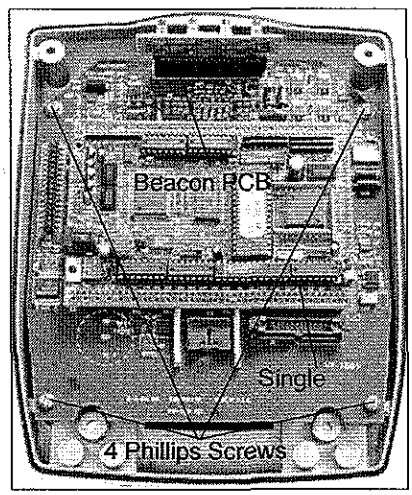


Figure 5-6a: Controller PCB

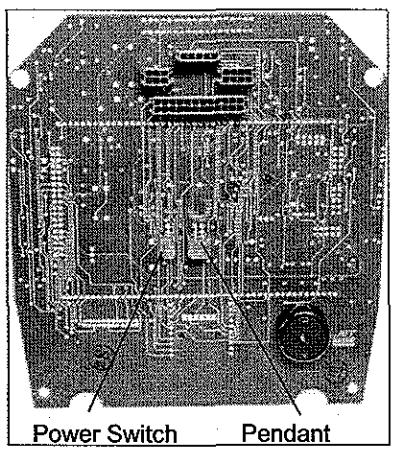


Figure 5-6b: Controller PCB (Back)

5.4.4.2 Installing the Controller PCB

For field-servicing, the replacement Controller PCB will have a factory-installed Single Board Computer. **For factory-servicing**, the system's original SBC will be reinstalled.

1. Hold the Controller PCB a few inches from the Injector Controller's Rear Enclosure. Connect the 2-pin connector (Pendant Port Cable Assembly) and the 4-pin connector (Power Switch Assembly) to the back of the PCB (see Figure 5-6b).

2. Use the Phillips screwdriver to secure the Controller PCB to the Injector Controller's Rear Enclosure (see Figure 5-6a).

3. If the original Single Board Computer had been removed as part of **factory-servicing**, carefully reinstall it (see Figure 5-6a).

4. Reinstall the Beacon PCB Assembly (see Figure 5-6a).

5. Connect the 6-pin, 8-pin, and 24-pin connectors to the back of the Controller PCB (see Figure 5-1a).

6. Install the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

7. Install the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).

8. Plug the Power Supply's AC/Mains power cord into the wall outlet and power up the system. Program the pressure profile into the new Single Board Computer (see Section 7.3.2 – Programming Pressure Profile Data).

9. After installation of Single Board Computer, perform the Linear Potentiometer adjustment (see Section 7.2 – Adjusting the Linear Potentiometer) then Field Test Form (see Section 7.1 – Field Test Form).

5.4.5 Replacing the EL Display

The EL (Electro-luminescent) display is mounted on the Injector Controller's Front Enclosure.

Required Tools: Phillips screwdriver

5.4.5.1 Removing the EL Display

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Remove the Injector Controller's Front Enclosure and place on a clean work surface (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).
3. Remove four corner Phillips screws and lock washers from the EL PCB (see Figure 5-7).
4. Remove the EL PCB.

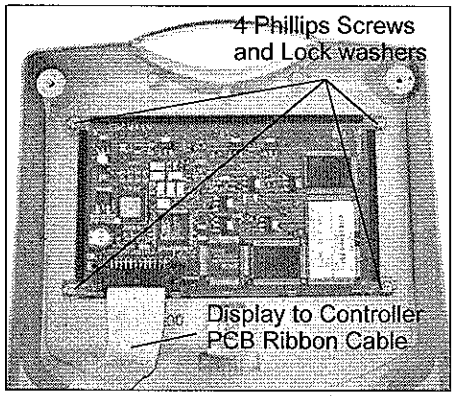


Figure 5-7: EL PCB

5.4.5.2 Installing the EL Display

1. Use a lint free cloth to remove any dust from the area.
2. Place the EL PCB inside the Injector Controller's Front Enclosure.
3. Secure the EL PCB to the enclosure with four corner Phillips screws and lock washers (see Figure 5-7).
4. Install the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).
5. After installation of EL Display, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.4.6 Replacing the Display to Controller PCB Ribbon Cable

The Display to Controller PCB Ribbon Cable is connected to the EL Display on the Front Enclosure and on the other end to the Injector Controller PCB.

Required Tools: Phillips screwdriver

5.4.6.1 Removing the Display to Controller PCB Ribbon Cable

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Remove the Injector Controller's Front Enclosure and place on a clean work surface (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).
3. Remove the Display to Controller PCB Ribbon Cable from the EL PCB (see Figure 5-7).

5.4.6.2 Installing the Display to Controller PCB Ribbon Cable

1. Connect the Display to Controller PCB Ribbon Cable to the EL PCB (see Figure 5-7).
2. Install the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).
3. After installation of Display to Controller PCB Ribbon Cable, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.4.7 Replacing the Membrane Panel

The Membrane Panel is mounted on the Injector Controller's Front Enclosure behind the EL PCB. There is no need to remove the EL PCB.

Required Tools: Phillips screwdriver

5.4.7.1 Removing the Membrane Panel

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Remove the Injector Controller's Front Enclosure and place on a clean work surface (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).
3. Remove the center Phillips screw with the lock washer and flat washer and lift the ground strap (see Figure 5-8).
4. Remove the EL Display (see section 5.4.5.1 - Removing the EL Display)
5. Carefully peel the Membrane Panel off of the front of the Front Enclosure.

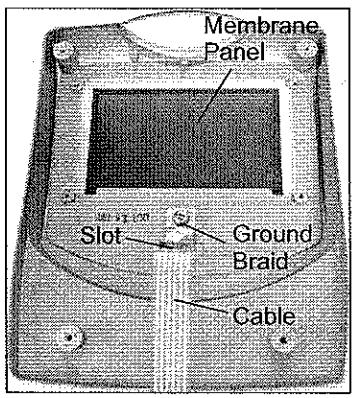


Figure 5-8: Membrane Panel

6. Remove the Membrane Panel pulling the ground braid and Membrane Panel cable through the slot of the Front Enclosure.

5.4.7.2 Installing the Membrane Panel

1. Clean the EL Display and Membrane Panel.
2. Place the Membrane Panel on the front recess of the Injector Controller's Front Enclosure.
3. Slide the Membrane Panel cable and ground braid through the slot in the Front Enclosure (see Figure 5-8).
4. Remove the backing tape from the Membrane Panel and carefully place the Membrane Panel in the recess of the Front Enclosure. There should be a consistent reveal (gap) all around the Membrane Panel in the recess.
5. Secure the ground braid to the center on the inside of the Front Enclosure. Insert flat washer, lock washer, and Phillips screw.
6. Replace the EL Display (see section 5.4.5.2 - Installing the EL Display)
7. Install the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).

8. After installation of Membrane Panel, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.4.8 Replacing the Beacon PCB

The Beacon PCB is mounted on top of the Controller PCB and contains LEDs that illuminate when the system is in the Pause or Arm mode and flashes when the Injector Plunger is moving.

Required Tools: Phillips screwdriver

5.4.8.1 Removing the Beacon PCB

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Remove the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).
3. Remove the Beacon PCB (see Figure 5-9).

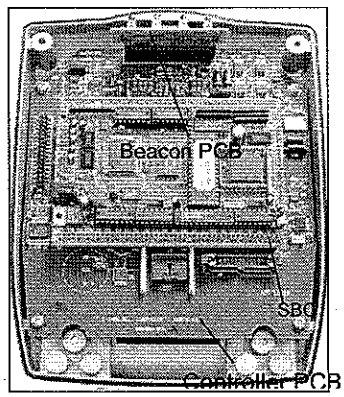


Figure 5-9: Beacon PCB

5.4.8.2 Installing the Beacon PCB

1. Install the Beacon PCB on top of the Controller PCB (see Figure 5-9).
2. Install the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).
3. After installation of Beacon PCB, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.4.9 Replacing the Injector's Power Switch Assembly

The Injector's power switch is a rocker switch located in back of the Injector Controller.

Required Tools: Phillips screwdriver
flat-edge screwdriver

5.4.9.1 Removing the Injector's Power Switch Assembly

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Remove the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

3. Disconnect the 6-pin, 8-pin, and 24-pin connectors from the back of the Controller PCB. Do not disconnect the Programming Header (see Figure 5-1a).

4. Remove the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).

5. Remove four corner Phillips screws from the Controller PCB (see Figure 5-6a).

6. Carefully lift the Controller PCB a few inches and disconnect the 2-pin connector (Pendant Port Cable Assembly) and the 4-pin connector (Power Switch Assembly) from the back of the PCB (see Figure 5-6b).

7. Remove the Controller PCB and put in a safe place on an ESD safe surface.

8. From inside the Injector Controller's Rear Enclosure, squeeze the locking tabs on the sides of the Power Switch Assembly and push out the power switch (see Figure 5-10).

5.4.9.2 Installing the Injector's Power Switch Assembly

1. Insert the wires of the Power Switch Assembly into the Injector Controller's Rear Enclosure through the enclosure's opening (see Figure 5-10). Orient the switch so that the "O" is on the bottom.

2. Push the switch into the opening until two clicks are heard.

3. Hold the Controller PCB a few inches from the Injector Controller's Rear Enclosure. Connect the 2-pin connector (Pendant Port Cable Assembly) and the 4-pin connector (Power Switch Assembly) to the back of the PCB (see Figure 5-6b).

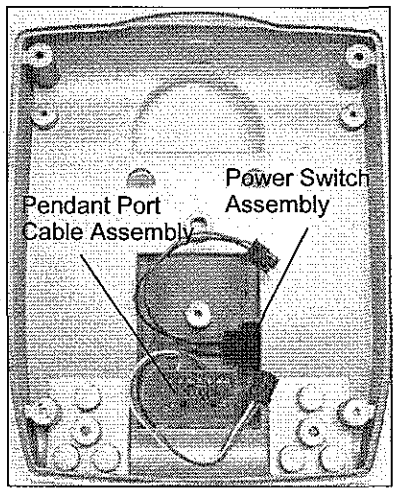


Figure 5-10: Rear Enclosure

4. Secure the Controller PCB to the Injector Controller's Rear Enclosure with four corner Phillips screws (see Figure 5-6a).

5. Connect the 6-pin, 8-pin, and 24-pin connectors to the back of the Controller PCB (see Figure 5-1a).

6. Install the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).

7. Install the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).

8. After installation of Injector Power Switch, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.4.10 Replacing the Injector's Pendant Port Cable Assembly

Required Tools: *Phillips screwdriver*
flat-edge screwdriver

Required Equipment: Loctite 242

5.4.10.1 Removing the Injector's Pendant Port Cable Assembly

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Disconnect and remove the Pendant Switch from the Injector Controller.
3. Remove the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).
4. Disconnect the 6-pin, 8-pin, and 24-pin connectors from the back of the Controller PCB. Do not disconnect the Programming Header (see Figure 5-1a).
5. Remove the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).
6. Remove four corner Phillips screws from Controller PCB (see Figure 5-6a).
7. Carefully lift the Controller PCB a few inches and disconnect the 2-pin connector (Pendant Port Cable Assembly) and the 4-pin connector (Power Switch Assembly) from the back of the PCB (see Figure 5-6b).
8. Remove the Controller PCB and put in a safe place on an ESD pad.
9. Remove two Phillips screws on either side of the Pendant Port (see Figure 5-11). It's located on the bottom of the Injector Controller's Rear Enclosure. Remove the Pendant Port Cable Assembly from the inside of the enclosure (see Figure 5-10).

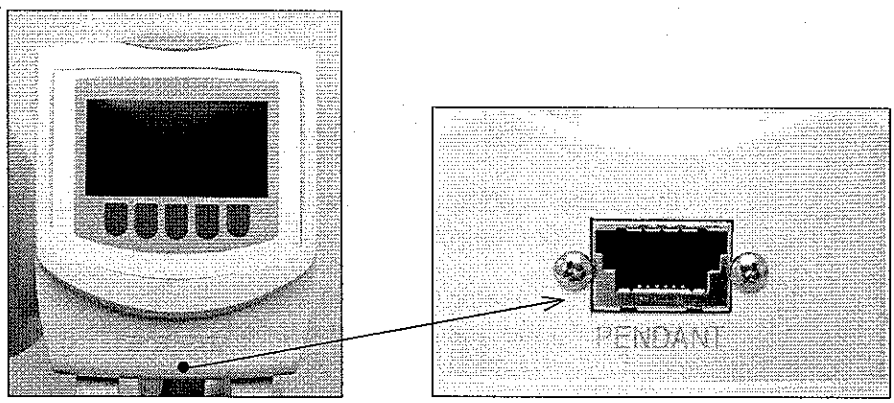


Figure 5-11: Pendant Port

5.4.10.2 Installing the Injector's Pendant Port Cable Assembly

1. Install the Pendant Port Cable Assembly into the Injector Controller's Rear Enclosure (see Figure 5-10).
2. Place Loctite 242 on the two Phillips screws and use them to secure the Pendant Port Assembly to the enclosure (see Figure 5-11).
3. Hold the Controller PCB a few inches from the Injector Controller's Rear Enclosure. Connect the 2-pin connector (Pendant Port Cable Assembly) and the 4-pin connector (Power Switch Assembly) to the back of the PCB (see Figure 5-6b).
4. Secure the Controller PCB to the Injector Controller's Rear Enclosure with four corner Phillips screws (see Figure 5-6a).
5. Connect the 6-pin, 8-pin, and 24-pin connectors to the back of the Controller PCB (see Figure 5-1a).
6. Install the Injector Controller Cable Cover (*see* Section 5.4.1 – Replacing the Injector Controller Cable Cover).
7. Install the Injector Controller's Front Enclosure (see Section 5.4.2 – Replacing the Injector Controller's Front Enclosure).
8. Connect the Pendant Switch to the Injector Controller.
9. After installation of Injector's Pendant Port Cable Assembly, perform the Field Test Form (see Section 7.1 – Field Test Form) in addition during Field Test Form, activate pendant switch during injection to verify that system can be paused and restarted through the pendant switch.

5.5 INJECTOR HEAD

This section provides procedures pertaining to the Injector Head.

5.5.1 Replacing the Injector Head's Rear Enclosure

The following provides procedures for removing and installing the Injector Head's Rear Enclosure.

Required Tools: Phillips screwdriver

5.5.1.1 Removing the Injector Head's Rear Enclosure

1. Retract the Injector ram to the Replace syringe position. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. If a syringe is installed, remove the syringe. Proceed with this procedure even if the syringe cannot be removed.

3. Pull off the Injector Hand Knob at the rear of the Injector Head (see Figure 5-12a).

4. Remove four Phillips screws from the Injector Head's Rear Enclosure (see Figure 5-12a).

5. Gently slide the Rear Enclosure towards the rear of the Injector Head and pull away a few inches (see Figure 5-12b).

6. Disconnect the Heater Harness from J5 on the Interconnect PCB (see Figure 5-12c). Place the Rear Enclosure on a clean surface.

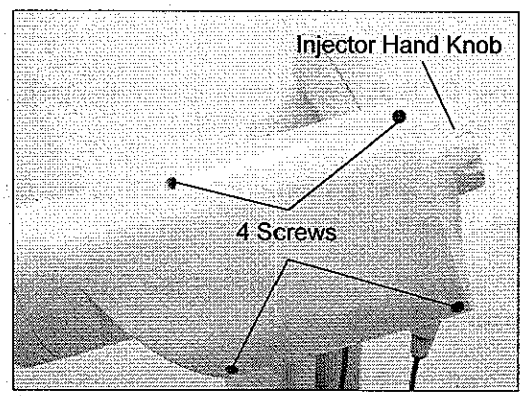


Figure 5-12a: Removing the Rear Enclosure

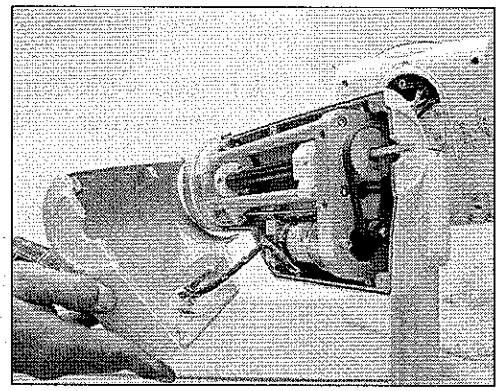


Figure 5-12b: Removing the Rear Enclosure

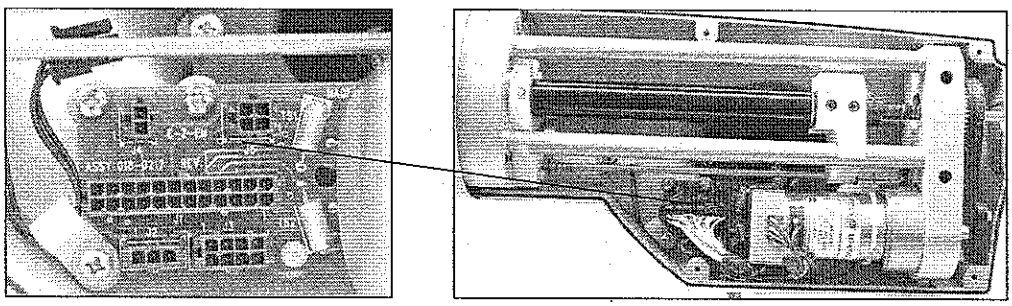


Figure 5-12c: Interconnect PCB

5.5.1.2 Installing the Injector Head's Rear Enclosure

1. Hold the Rear Enclosure close to the Injector Head and connect the heater harness to J5 on the Interconnect PCB (see Figure 5-12c).

2. Position the Rear Enclosure against the Injector head and slide forward. **Be careful not to pinch wires while positioning the Rear Enclosure.**

3. Secure the Rear Enclosure with four Phillips screws (see Figure 5-12a).

4. Install the Injector Hand Knob at the rear of the Injector Head (see Figure 5-12a). Make certain that the knob does not rub against the enclosure surface.

5. After installation of Injector Head Rear Enclosure, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.5.2 Replacing the Syringe Warmer

To remove the Syringe Warmer, detach it from the syringe and disconnect it from the connector on the Injector Head (see Figure 5-13).

Follow the reverse procedure for installation. Verify that the heater does properly warm by initializing the injector and retracting the Injector ram to the midway position. The Syringe Warmer should start to get warm.

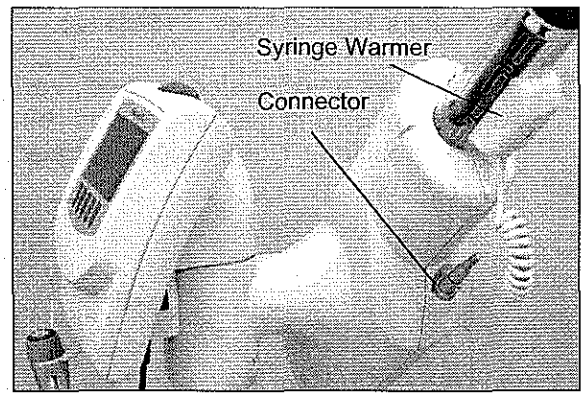


Figure 5-13: Syringe Warmer

5.5.3 Replacing the Heater Harness

The Heater Harness is installed in the Injector Head's Rear Enclosure.

Required Tools: *Phillips screwdriver*
adjustable wrench

5.5.3.1 Removing the Heater Harness

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. Remove the Injector Head's Rear Enclosure and place on a clean work area (see Section 5.5.1 – Replacing the Injector Head's Rear Enclosure).

3. Remove the loop clamp by removing the Phillips screw, flat washer and lock washer (see Figure 5-14).

4. Use the adjustable wrench to remove the hex nut on the inside of the Rear Enclosure (see Figure 5-14) and remove the Heater Harness.

Note: There is a nylon washer that is part of the assembly and cannot be removed.

5.5.3.2 Installing the Heater Harness

1. Install the Heater Harness into the Injector Head's Rear Enclosure. Make certain the black arrow on the connector is pointing to the bottom of the enclosure (see Figure 5-14).
2. Use the adjustable wrench to secure the Heater Harness with the hex nut (see Figure 5-14). **DO NOT OVERTIGHTEN.**
3. Secure the cable with the loop clamp. Install in the following order: loop clamp, flat washer, lock washer, and Phillips screw (see Figure 5-14).
4. Install the Injector Head's Rear Enclosure (see Section 5.5.1 – Replacing the Injector Head's Rear Enclosure).
5. After installation of heater harness, verify that the heater does properly warm by initializing the injector and retracting the Injector ram to the midway position. The Syringe Warmer should start to get warm.

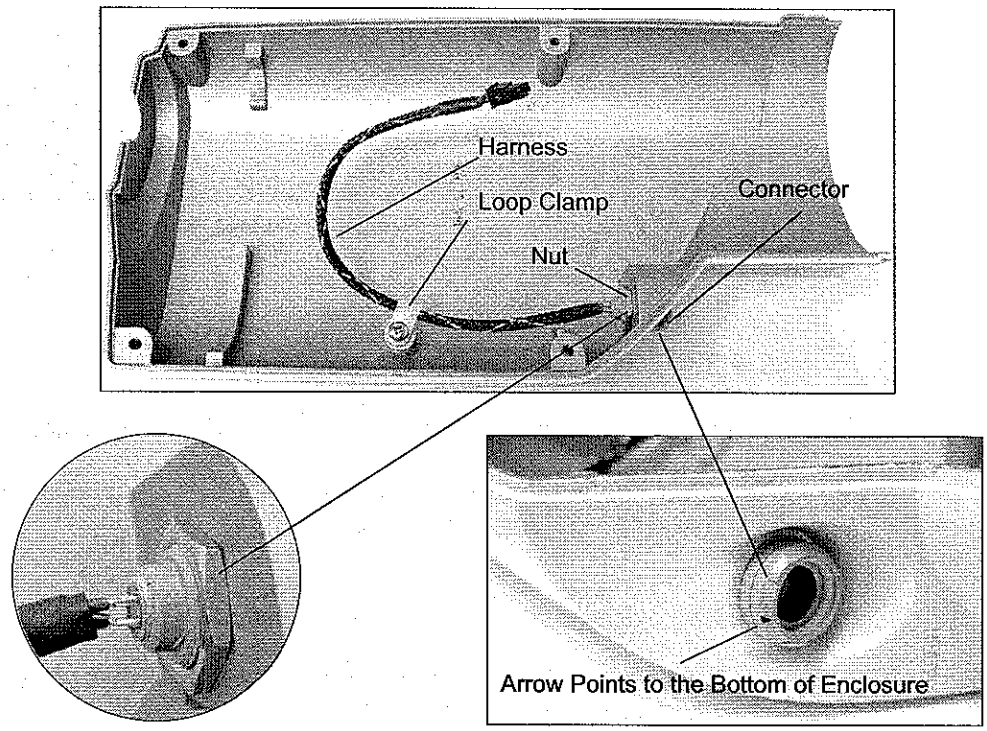


Figure 5-14: Heater Harness

5.5.4 Replacing the Injector Mechanism

The Injector Mechanism is installed in the Injector Head's Front Enclosure.

Required Tools: Phillips screwdriver
9/64" hex key

5.5.4.1 Removing the Injector Mechanism

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. Remove the Injector Head's Rear Enclosure (see Section 5.5.1 – Replacing the Injector Head's Rear Enclosure).

3. Disconnect the following connectors from the Interconnect PCB (see Figure 5-15a):

   a. Door Sensor from J4.

   b. Linear Potentiometer from J2.

   c. Motor Connector from J3

   Note: The Heater Harness was disconnected from J5 when the Rear Enclosure was removed. Do not remove the 24-pin connector from J1.

4. Remove the Phillips screw from the lower left corner of the Interconnect PCB. The screw secures the Interconnect PCB and the Door Harness loop clamp to the Front Enclosure. Remove the lock washer and flat washer with the screw (see Figure 5-15a).

5. While firmly holding onto the Injector Mechanism, use the 9/64" hex key to remove two socket head cap screws and lock washers that secure it to the Front Enclosure (see Figure 5-15b). **Do not allow the Injector Mechanism to drop.** Slightly tip the Injector Mechanism to allow the screws and lock washers to fall out.

6. Angle the Injector Mechanism to allow access to the Door Harness' second loop clamp. While holding the Injector Mechanism, remove the clamp's Phillips screw, lock washer, and flat washer. The clamp will remain hanging on the Door Harness (see Figure 5-15c).

7. Remove the Injector Mechanism and place on a clean work surface.

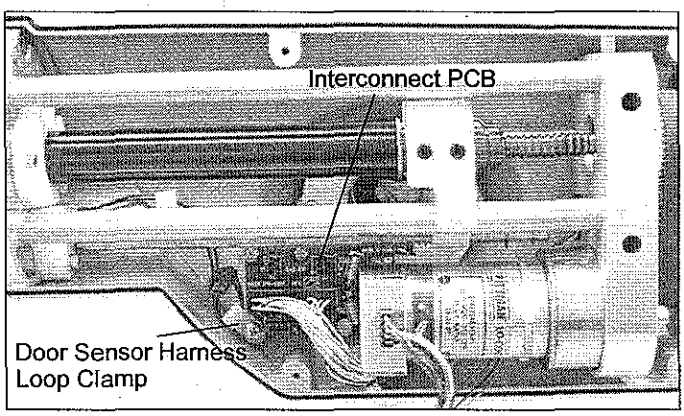


Figure 5-15a: Removing Connectors and Loop Clamp

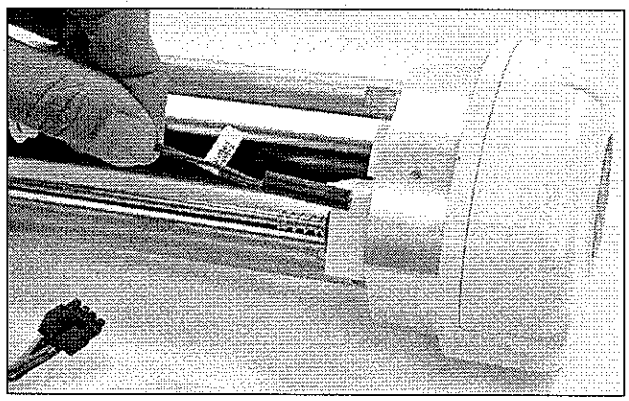


Figure 5-16b: Removing the Door Sensor

5.5.5.2 Installing the Door Sensor

1. Install Door Sensor Assembly into back of Door Housing. Keep assembly flush with back surface of Door Housing. Secure by tightening the set screw with the 1/16" Allen wrench. Do not over-tighten (see Figure 5-16a and Figure 5-16b).

2. Install the Injector Mechanism (see Section 5.5.4 – Replacing the Injector Mechanism).

3. Install the Injector Head's Rear Enclosure (see Section 5.5.1 – Replacing the Injector Head's Rear Enclosure).

4. After installation of Door Sensor, perform the Linear Potentiometer adjustment (see Section 7.2 – Adjusting the Linear Potentiometer) then Field Test Form (see Section 7.1 – Field Test Form).

5.5.6 Replacing the Motor

Required Tools: Phillips screwdriver
9/64" hex key
5/32" hex key
wire cutter
Milbar #4460R Retaining Ring Tool

5.5.6.1 Removing the Motor

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. Remove the Injector Head's Rear Enclosure (see Section 5.5.1 – Replacing the Injector Head's Rear Enclosure).

3. Remove the Injector Mechanism and place on a clean work area (see Section 5.5.4 – Replacing the Injector Mechanism).

4. Remove the Timing Belt from pulley. Pull it off while turning (see Figure 5-17a).

5. Use the Milbar #4460R retaining ring tool to remove the external retaining ring from the motor pulley (see Figure 5-17b).

6. Pull off the Motor Pulley (see Figure 5-17c).

7. Use the wire cutters to cut the cable tie securing the Linear Potentiometer Harness to the Motor (see Figure 5-17d).

8. Use the 5/32" hex key to remove two socket head cap screws (see Figure 5-17e).

9. Remove the Motor (see Figure 5-17f).

5.5.6.2 Installing the Motor

1. Position the Motor in the Injector Mechanism. The Motor Harness must be positioned toward the outside of the mechanism. Improper orientation will prevent installation of the Timing Belt (see Figure 5-17f).

2. Use the 5/32" hex key to secure the Motor with two socket head cap screws (see Figure 5-17e).

3. Use a cable tie to secure the Linear Potentiometer Harness to the Motor (see Figure 5-17d).

4. Install the Motor Pulley (see Figure 5-17c).

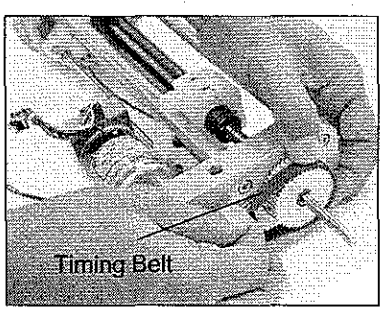
5. Use the Milbar #4460 R retaining ring tool to install the external retaining ring (see Figure 5-17b).

6. Install the Timing Belt. Turning the belt will help installation (see Figure 5-17a).

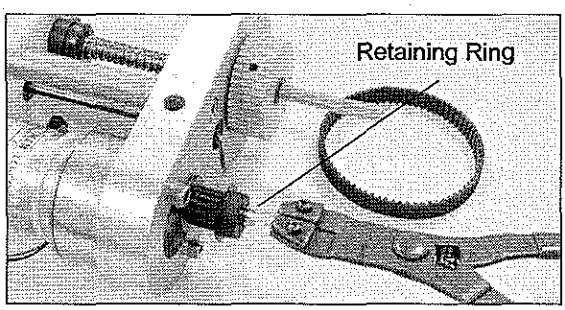
7. Install the Injector Mechanism (see Section 5.5.4 – Replacing the Injector Mechanism).

8. Install the Injector Head's Rear Enclosure (see Section 5.5.1 – Replacing the Injector Head's Rear Enclosure).

9. After installation of Motor assembly, perform the Linear Potentiometer adjustment (see Section 7.2 – Adjusting the Linear Potentiometer), Setting of Pressure Limiting Constants (see section 7.4 – Pressure Limiting Constants Procedure) then Field Test Form (see Section 7.1 – Field Test Form).



(a)



(b)

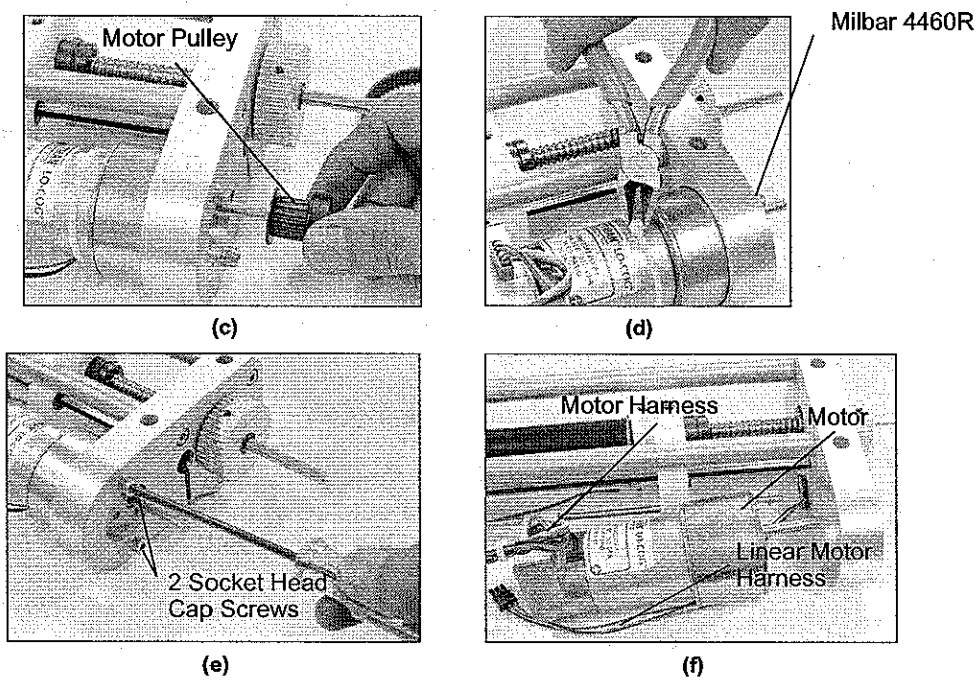


Figure 5-17: Removing the Motor

5.5.7 Replacing the Linear Potentiometer

The Linear Potentiometer is located in the Injector Mechanism. Replacement consists of two separate procedures: (1) Replacing the Linear Potentiometer Cable Assembly consisting of the rod and wire harness and (2) Replacing the Wiper Assembly, which is located in the Anti-Rotation Bracket. The Anti-Rotation Bracket is located on the Ball Screw Assembly.

Required Tools: Phillips screwdriver
9/64" hex key
wire cutter
Milbar #4450R Retaining Ring Tool

5.5.7.1 Removing the Linear Potentiometer

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. Remove the Injector Head's Rear Enclosure (see Section 5.5.1 – Replacing the Injector Head's Rear Enclosure).

3. Remove the Injector Mechanism and place on a clean work area (see Section 5.5.4 – Replacing the Injector Mechanism).

4. Remove the Timing Belt from pulley. Pull it off while turning (see Figure 5-17a).

5. Ensure that the Anti-Rotation Bracket is at least 6" from the Motor and Bearing Mounting Plate Assembly. If necessary, move the Anti-Rotation Bracket by manually turning the Ball Screw Pulley (see Figure 5-18a).

6. Remove the Linear Potentiometer Cable Assembly as follows:

   a. Use the wire cutters to cut the cable tie securing the Linear Potentiometer Harness to the Motor (see Figure 5-17d).

   b. Use the Phillips screwdriver to loosen the clamp securing the Linear Potentiometer Cable Harness to the Motor and Bearing Mounting Plate. Release the harness from the clamp (see Figure 5-18a). Do not remove the clamp.

   c. Use the Milbar #4450R retaining ring tool to remove the retaining ring on top of the Motor and Bearing Mounting Plate (see Figure 5-18b).

   d. Pull out the Linear Potentiometer Cable Assembly. It has one flat washer and one spring washer (see Figure 5-18c).

7. Remove the Wiper Assembly as follows:

   a. Use the Milbar #4450R retaining ring tool to remove the retaining ring that secures the Wiper in the Anti-Rotation Bracket.

   b. Remove the spring washer, flat washer, Wiper, and flat Washer (see Figure 5-18e).

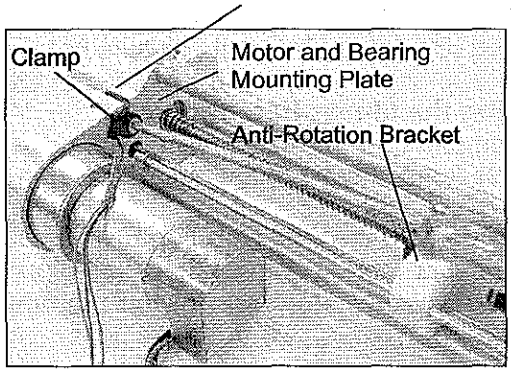


Figure 5-18a: Loosening Clamp

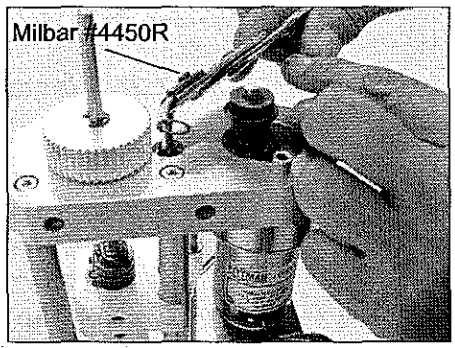


Figure 5-18b: Removing Retaining Ring

5.8 EDA

This section applies only to systems that include the EDA module.

5.8.1 Replacing the EDA PCB

Required Tools: Phillips screwdriver

5.8.1.1 Removing the EDA PCB

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. While holding onto the EDA module's Front Enclosure, remove the four corner Phillips screws from its Rear Enclosure. Remove the Front Enclosure (see Figure 5-23a).
3. Remove the two connectors at J1 and J2 from the EDA PCB (see Figure 5-23b).
4. Use the Phillips screwdriver to remove the three screws and lock washers securing the EDA PCB to the Rear Enclosure (see Figure 5-23b). Remove the EDA PCB.

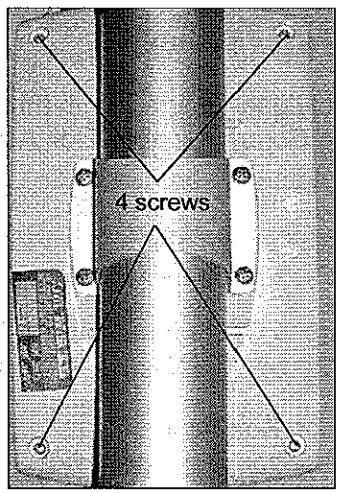


Figure 5-23a: Rear Enclosure

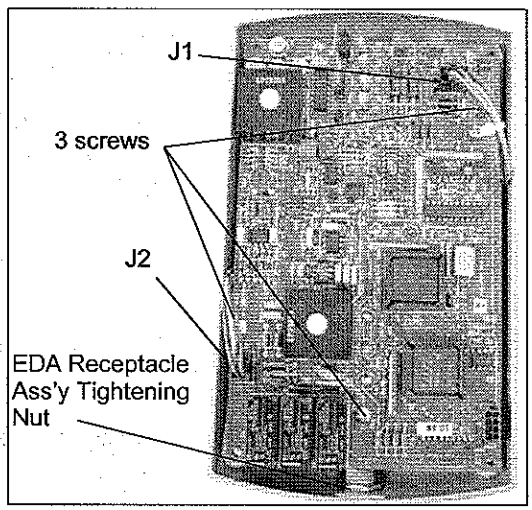


Figure 5-23b: EDA PCB

5.8.1.2 Installing the EDA PCB

1. Place the EDA PCB inside its Rear Enclosure and secure with three Phillips screws and lock washers (see Figure 5-23b).
2. Connect the EDA Receptacle Assembly to J1 on the EDA PCB (see Figure 5-23b).
3. Connect the EDA PCB to Power/Comm. Connector Harness to J2 on the EDA PCB (see Figure 5-23b).

4. Replace the Front Enclosure and secure with four corner Phillips screws at the Rear Enclosure (see Figure 5-23a).

5. After installation of EDA PCB, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.8.2 Replacing the EDA PCB to Power/Comm. Connector Harness

Required Tools: Phillips screwdriver

5.8.2.1 Removing the EDA PCB to Power/Comm. Connector Harness

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. Uninstall the EDA module from its mounting (see Section 5.9.5 – Replacing the EDA Module).

3. Remove the EDA PCB (see Section 5.8.1 – Replacing the EDA PCB).

4. Remove the EDA PCB to Power/Comm. Connector Harness by pressing the connector out from the EDA Rear Enclosure.

5.8.2.2 Installing the EDA PCB to Power/Comm. Connector Harness

1. Install the EDA PCB to Power/Comm. Connector Harness into the EDA Rear Enclosure.

2. Install the EDA PCB (see Section 5.8.1 – Replacing the EDA PCB).

3. Install the EDA module on its mounting (see Section 5.9.5 – Replacing the EDA Module).

4. After installation of EDA Module, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.8.3 Replacing the EDA Receptacle Assembly

Required Tools: Phillips screwdriver
adjustable wrench

5.8.3.1 Removing the EDA Receptacle Assembly

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. Uninstall the EDA module from its mounting (see Section 5.9.5 – Replacing the EDA Module).

3. Remove the EDA PCB (see Section 5.8.1 – Replacing the EDA PCB).

4. Use the adjustable wrench to loosen the nut and remove the EDA Receptacle Assembly (see Figure 5-23b).

5.8.3.2 Installing the EDA Receptacle Assembly

1. Install the EDA Receptacle Assembly and nut. Tighten using the adjustable wrench (see Figure 5-23b).
2. Install the EDA PCB (see Section 5.8.1 – Replacing the EDA PCB).
3. Install the EDA module on its mounting (see Section 5.9.5 – Replacing the EDA Module).
4. After installation of EDA Module, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.9 UNINSTALL/INSTALL SYSTEM COMPONENTS

At times, it may become necessary to uninstall system components for the purpose of making repairs or returning to E-Z-EM service. The following provides procedures for uninstalling and reinstalling those components.

5.9.1 Replacing the Power/Communications Cable

The power/communications cable is connected on one end to the Injector pigtail cable and at the other end to the Power Supply.

Required Tools: Phillips screwdriver

5.9.1.1 Uninstalling the Power/Communications Cable

1. Power down the system and unplug the power supply from the facility outlet.

2. To remove the power/communications cable from a floor mounting installation, do the following:

   a. Lift the stand's shroud and disconnect the power/communications cable from the Injector pigtail cable (see Figure 5-24a).

   b. Remove the Phillips screws on the two neoprene clamps securing the cable to base leg (see Figure 5-24a) and replace the shroud.

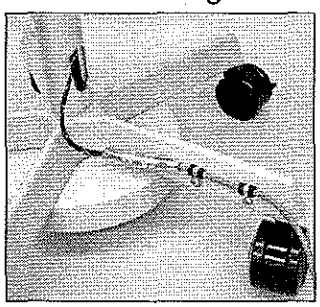


Figure 5-24a

   c. Disconnect the cable from the Power Supply and remove.

3. To remove the power/communications cable from an overhead mounting (wall or ceiling), do the following:

   a. Disconnect the power/communications cable from the Injector pigtail cable (see Figure 5-24b).

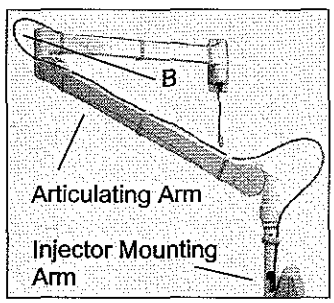


Figure 5-24b

   b. Remove the seven cable ties securing the cable to the Injector Mounting Arm and the Articulating Arm (see Figure 5-24b).

   c. Disconnect the cable from the Power Supply and remove.

5.9.1.2 Installing the Power/Communications Cable

1. To install the power/communications cable on a floor mounting installation, do the following:

   a. Lift the stand's shroud and connect the power/communications cable to the Injector pigtail cable (see Figure 5-24c).

   b. Secure the cable to the base leg (with predrilled holes) using two neoprene clamps and two Phillips screws (see Figure 5-24a).

   c. Replace the shroud. Position it so that the irregular key slides over the leg with the anchored cable and press down until a snap is heard. Verify the shroud is in place and cannot be easily lifted. (see Figure 5-24d).

   d. Route the power/communications cable and connect the other end to the Power Supply (6-pin connector). Tighten securely.

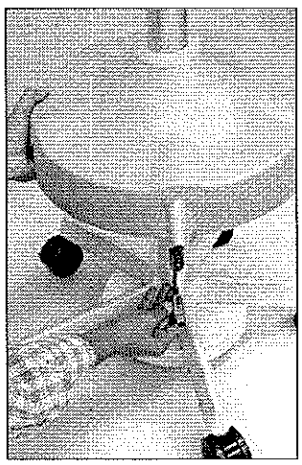


Figure-5-24c: Injector Pigtail

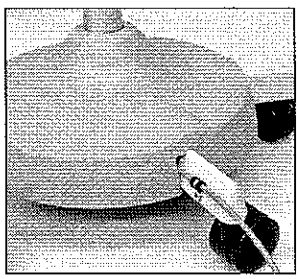


Figure 5-24d: Replacing Shroud

2. To install the power/communications cable on an overhead mounting (wall or ceiling) installation, do the following:

   a. Connect the power/communications cable to the Injector cable (see Figure 5-24b).

   b. Referring to Figure 5-24b, use the seven cable ties provided to secure the cable to the Injector Mounting Arm and the Articulating Arm. Leave sufficient slack in service loops A and B to facilitate full range of motion of all supporting members.

   c. Route the power/communications cable and connect the other end to the Power Supply (6-pin connector). Tighten securely.

3. After installation of Power/Communications Cable, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.9.2 Replacing the Communications Cable

The Communications cable is connected on one end to the Remote Control and at the other end to the Power Supply.

5.9.2.1 Uninstalling the Communications Cable

1. Power down the system and unplug the Remote Control from the facility power.
2. Disconnect the cable at the Power Supply and at the Remote Control (see Figure 5-25).
3. Make note of the current routing for installation purposes.

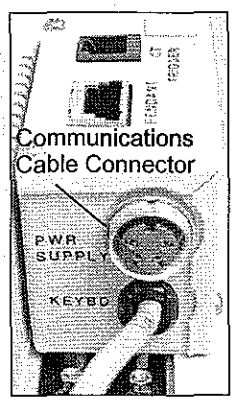


Figure 5-25: Remote Connector

5.9.2.2 Installing the Communications Cable

1. Connect the cable to the Remote Control and Power Supply. Use the original routing.
2. After installation of Communications Cable, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.9.3 Replacing the Injector

There are two separate procedures for uninstalling/installing the Injector. One is for the floor mounting installation and the other is for the overhead (wall or ceiling) mounting installation.

Required Tools: *Phillips screwdriver*
External Retaining Ring Tool
5 mm allen wrench

5.9.3.1 Uninstalling the Injector (Floor Mounting)

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Ensure that all casters on the floor stand base are locked.
3. If necessary, remove the Heater, Pendant Switch and bracket, and the EDA Clip and bracket (if applicable) as follows:
   a. Unplug the Heater from the Injector Head. If it mounted on a syringe, remove the Heater and the syringe.

WARNING **Sudden release of the Spring Arm may result in personal injury.**

5. Lower and hold the Spring Arm at about 10° below the Horizontal Arm. Insert an Allen key, as shown in Figure 5-28c, and turn clockwise to decrease height limit to decrease height to a horizontal position.

6. Remove the Injector Mounting Arm with the Injector as follows:

   a. Collar (A) on the Spring Arm of the Articulating Arm is secured to sleeve (B) with screw (C) (see Figure 5-27a) located opposite the semi-lunar groove (see Figure 5-27b). Remove Phillips screw (C).

   b. Slide the collar upward and insert screw (C) into the unthreaded hole under the collar. Allow the collar to rest on the screw (see Figure 5-27c).

   c. While holding onto the Injector Mounting Arm, remove the semi-lunar retainer (D) and remove the arm with the Injector on it (see Figure 5-27d). **Do not allow the Injector Mounting Arm with the Injector to drop.**

   d. Place the Injector Mounting Arm and Injector on a clean work area.

7. Remove three hole-plugs from the Injector then remove the Phillips screws from those holes.

8. *Carefully remove the Injector from the Injector Mounting Arm.* **The Injector Mounting Arm has two keyways. Note which keyway was used for mounting the Injector.**

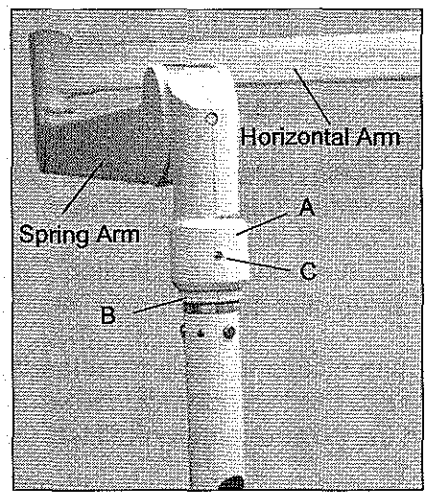


Figure 5-27a: Articulating Arm

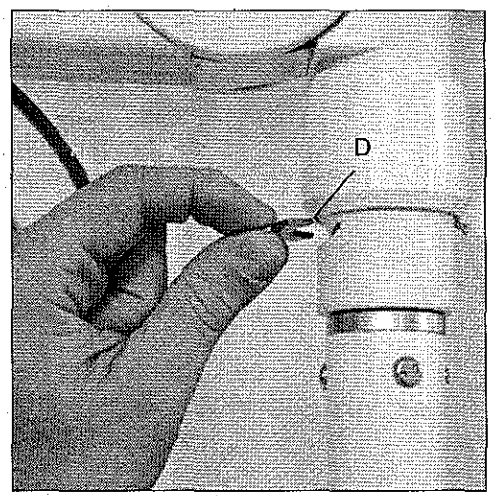


Figure 5-27b: Semi-lunar Retainer

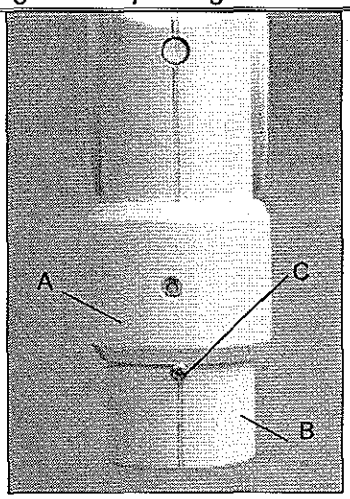


Figure 5-27c: Raised Collar

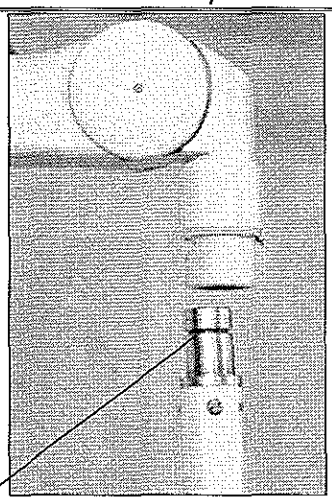


Figure 5-27d: Injector Mounting Arm Removed

Groove for semi-lunar retainer

5.9.3.4 Installing the Articulating Arm

1. Place the thrust washer (A) over the pivot shaft. The thrust washer is provided with the Injector Mounting Arm hardware.
2. Lightly coat the pivot shaft with the supplied grease. Use approximately one-quarter to one-half of the tube contents.
3. Remove the Articulating Arm from its packaging.
4. There is a plastic cover on the end of the Horizontal Arm that fits over the pivot shaft. Unsnap and remove both halves of the cover.
5. Place the Articulating Arm over the pivot shaft.
6. Using a retaining ring tool, install the retaining ring in the pivot shaft's groove. The retaining ring is provided with the Injector Mounting Arm hardware and is used for the ceiling mounting configuration only.
7. Replace both halves of the plastic cover on the Horizontal Arm over the pivot shaft and snap together. Clean any remaining grease from the covers and articulating arm.

5.9.3.5 Installing the Injector (Overhead Mounting)

1. Working in a clean work area, install the Injector onto the Injector Mounting Arm as follows:
   a. Place the Injector Mounting Arm on a flat surface. Notice that it has two keyways on the short leg (where the Injector is to be mounted). Make certain that the keyway used in the original installation is facing up.

b. Insert both of the Injector's cables into the short leg of the Injector Mounting Arm (see Figure 5-27e).

c. Continue feeding the cables. Pull the Injector cable and its connector through the top hole of the Injector Mounting Arm and the EDA cable through the arm's lower hole that's facing up (see Figure 5-27f).

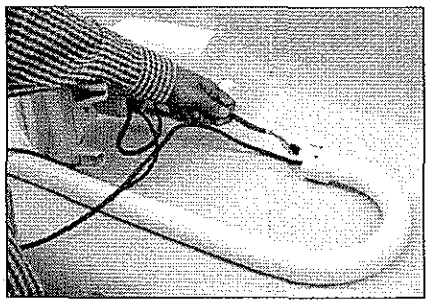


Figure 5-27e: Installing Injector

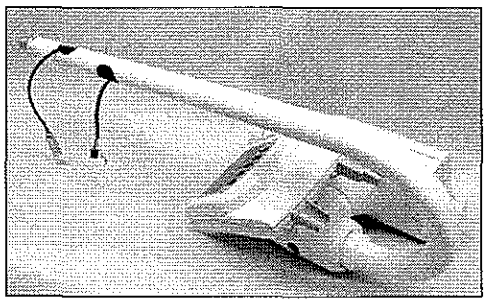


Figure 5-27f: Installing Injector

d. Install the Injector by rotating it until the key inside the Injector slides into the keyway of the Injector Mounting Arm. **Make certain to use the keyway used in the previous installation.**

e. Secure the Injector to the Injector Mounting Arm using three Phillips screws then insert the hole-plugs.

2. Install the Injector Mounting Arm as follows:

   a. Carefully insert the Injector Mounting Arm into the Spring Arm's sleeve (see Figure 5-27d) and insert the semi-lunar retainer (D) evenly into the slot in the sleeve (see Figure 5-27b). Make certain that it engages the groove in the Injector Mounting Arm.

   b. Remove screw (C). Lower collar (A) back to its original position and secure with Phillips screw (C) (see Figure 5-27a).

   c. Verify that the Injector Mounting Arm rotates freely within the sleeve.

3. If no EDA is to be installed, push the EDA cable and connector back into the Injector Mounting Arm and insert a hole-plug; otherwise, allow the cable to hang outside of the arm and install the EDA module (see Section 5.9.5 – Replacing the EDA Module).

4. Install the power/communications cable (see Section 5.9.1 – Replacing the power/communications Cable).

5. Install Heater, Pendant Switch and bracket, and EDA Clip and bracket (if applicable) as follows:

   a. Plug the Heater into the Injector Head below the Syringe Nest.

   b. Secure the Pendant Switch bracket to the left side of the Injector Controller (when facing Injector Controller) with three Phillips screws.

Plug the Pendant Switch into the bottom of the Injector Controller and rest it in the bracket.

c. Secure the EDA Clip bracket to the right side of the Injector Controller (when facing Injector Controller) with three Phillips screws. Plug the EDA Clip into the EDA module and rest it in the bracket.

6. Test the Articulating Arm's height and tension and adjust if necessary (see Section 7.4 – Height and Tension Adjustments) then perform the Field Test Procedure (see Section 7.1).

5.9.4 Replacing the EDA Module

These procedures apply only to systems that have the EDA installed. In the floor mounting installation, the EDA is installed below the Injector. In the overhead mounting installations, the EDA is installed above the Injector. Regardless of the mounting installation, the EDA installation procedure is the same.

Required Tools: Phillips screwdriver

5.9.4.1 Uninstalling the EDA Module

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.

2. Remove the four Phillips screws securing the bracket to the EDA. Hold onto the EDA and remove the bracket (see Figure 5-28a).

3. Disconnect the EDA pigtail cable from the back of the EDA module.

4. Remove the Phillips screw and lock washer from the ground post in back of the EDA module and remove the EDA's ground lug (see Figure 5-28b). Remove the EDA module.

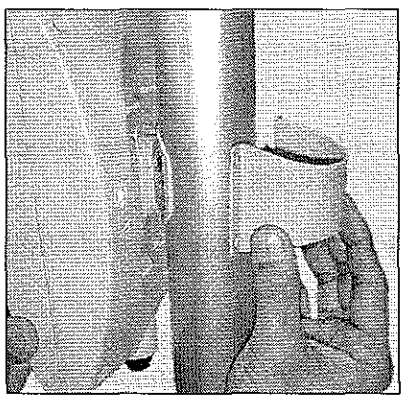


Figure 5-28a: Uninstalling the EDA

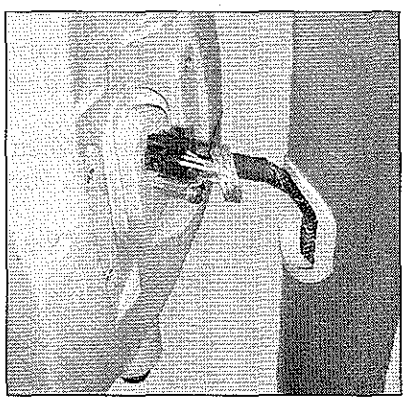


Figure 5-28b: EDA Connector

5.9.4.2 Installing the EDA Module

1. Locate the EDA cable inside the pole (floor mounting) or the Injector Mounting Arm (overhead mounting). Pull out the connector and a few inches of the cable.
2. Pull the connector through the EDA grommet and insert into the pole's/arm's opening.
3. Remove the Phillips screw and lock washer from the ground post in back of the EDA module (see Figure 5-28b).
4. Place the EDA cable's ground lug on the module's ground post. Replace the lock washer and Phillips screw and tighten.
5. Connect the EDA's cable to the back of the EDA module above the ground post.
6. Ensure that the E-Z-EM logo on the module is on the bottom. Feed the excess EDA cable back into the pole/arm until the module is flush with the pole/arm.
7. Mount the EDA module to the Injector Mounting Arm or pole using the module bracket and 4 Phillips screws (see Figure 5-28a).
8. After installation of EDA, perform the Field Test Form (see Section 7.1 – Field Test Form).

5.9.5 Replacing the Power Supply

The Power Supply can be wall mounted or placed on a flat surface.

Required Tools: Phillips screwdriver

5.9.5.1 Uninstalling the Power Supply

1. Power down the system and disconnect the Power Supply's AC/Mains power cord from the wall outlet.
2. Use the Phillips screwdriver to loosen the clamp securing the AC/Mains power cord. Remove the cord.
3. Disconnect the power/communications and 50-ft cables from the Power Supply.
4. If the Power Supply is placed on a flat surface, remove it. If it is wall-mounted, slide up and off the mounting screw heads.

5.9.5.2 Installing the Power Supply

1. Place the Power Supply on a flat surface. For wall mounting, position power supply so that mounting holes is over the mounting screw heads. Push in and slide down.